

L 25106-65 EMT(m)/EPP(c)/EPR/EMP(j)/T/EMP(v) Pc-l/Pr-l/Pe-l WW/RM

ACCESSION NR: AP5001768

S/0063/64/009/006/0654/0660

AUTHOR: Kargin, V. A. (Academician); Flats, N.A. (Candidate of chemical sciences)

TITLE: The role of structure in chemical transformations of polymers

SOURCE: Vsesoyuznoye khimicheskoye obshchestvo. Zhurnal, v. 9, no. 6, 1964, 654-660

TOPIC TAGS: submolecular polymer structure, polymer spacial microstructure, stereospecific polymerization, rubber vulcanization, conjugated bond system

ABSTRACT: This is a survey of literature on the influence of specific physical structure in polymers upon chemical reactions. It is shown that the character of structural formation in the macromolecule may determine the direction of chemical processes in polymers and vice versa. Thus polymers with different microstructures of isotactic, syndiotactic or other spatial sequence of members are diastereomers with essentially different properties. This is particularly apparent in reactions where functional groups of the macromolecule may influence reactions of adjoining groups; thus the interaction of substituents unconnected by valence

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ACCESSION NR: AP5001768

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bonds(side groups) was found decisive for the chain formation in stereo-specific polymerization/ and for the different behavior of chemically identical but spatially differing polymers. Examples are given for hydrolysis, such as that of polyvinyl-acetate/ of syndiotactic and isotactic structure, reactions in dilute solutions, cyclization processes, dehydrochlorination, as that of polyvinylchloride/ which is facilitated by a syndiotactic structure of the polymer. In the solid state, reactivity is determined by the close packing of molecules, their adhesive properties/5 and the steric factor of crystalline substances. Intermolecular interaction is particularly important for the reactivity of polymers with rigid chains (e. g. hydroxy-groups in cellulose). In thermodynamic calculations, the decreased chemical reactivity of the structured polymer has to be taken into account, i. e. the energy required to destroy the ordered structure. Changes in electro-physical properties of systems with conjugated bonds/ may be explained by the presence or absence of crystallization; the latter may be obtained by adding side groups. Non-structured polymers are the exception rather than the rule. The importance of this fact is shown on various examples in liquid as well as solid polymers, e. g. rubber vulcanization/ seems to proceed at the submolecular rather than the molecular level. Orig. art. has: no graphics

Card 2/3

L 25106-65

ACCESSION NR: AP5001768

ASSOCIATION: None

SUBMITTED: 00

ENCL: 00

SUB CODE: MT, GC

NR REF SOV: 020

OTHER: 015

Card 3/3

KARGIN, V.A.; SAFRONOV, N.Ya.; BERESTNEVA, Z.Ya.

Thermal decomposition of benzene over a heated molybdenum wire  
studied with the aid of rapid cinematography. Koll.zhur. 26  
no.2:198-199 Mr-Ap '64. (MIRA 17:4)

1. Fiziko-khimicheskiy institut imeni Karpova i Nauchno-issledovatel'skiy  
institut shinnoy promyshlennosti, Moskva.



KARGIN, V.A., akademik; ROKHLIN, M.I., kand.tekhn.nauk

Principal tasks facing the chemical sciences. Vest. AN SSSR  
34 no. 1:3-9 Ja '64. (MIRA 17:5)

EFENDIYEV, A.A.; CHERNEVA, Ye.P.; TUNITSKIY, N.N.; KARGIN, V.A.

Kinetics of ion extraction by polymeric complex-forming films.  
Zhur. fiz. khim. 38 no.4:1035-1038 Ap '64. (MIRA 17:6)

1. Fiziko-khimicheskiy institut imeni L.Ya. Karpova.

L 27901-65 EWT(a)/EPT(c)/T/EPT(j)/EPR Po-l/Pr-l/Ps-l RPL WW/RH

ACCESSION NR: AP4012974

S/0020/64/154/004/0890/0893

AUTHORS: Vinogradov, G.V.; Malkin, A. Ya.; Prozorovskaya, N.V.;  
Kargin, V.A. (Academician)

TITLE: The geology of polymers. Universal invariant thermal  
characteristics of condensed polymer viscosity

SOURCE: AN SSSR. Doklady\*, v. 154, no. 4, 1964, 890-893

TOPIC TAGS: viscosity, effective viscosity, polymer system, de-  
formation, deformation rate, linear polymer, polypropylene, poly-  
ethylene, plasticized rubber, cellulose acetate, viscosity curve,  
macromolecule, Bueche theory, Newtonian viscosity

ABSTRACT: It has been shown that effective viscosity can be repre-  
sented as the product of two functions, one of which depends only on  
the temperature and the other only on the deformation rate. A com-  
parison of the invariant-temperature curves of various polymers  
shows that, when adjusted parameters are used, the viscous proper-

Card 1/3

L 27903-65

ACCESSION NR: AP4012974

ties of linear polymers can be described in the first approximation by one universal dependence which is invariant in relation to temperature as well as in relation to the type of polymer. The plotting of flow curves of polymer solutions in normalized coordinates has revealed that when the polymer content of the system is low, the flow curves are sharply different in shape and in relation to the universal viscosity curve. The existence of universal viscous properties of linear polymers is explained by the cooperative nature of the macromolecule deformation process, and it shows that the effect of the deformation rate on the molecular interaction and destruction of the supermolecular structures of the polymers in a viscous-flow state does not in any way depend on their nature. It is assumed that the statistical factor reflecting the interrelation of the movement of molecular-kinetic units is the same for all linear polymeric molecules. Orig. art. has: 2 figures, 5 formulas.

ASSOCIATION: Laboratoriya geologii polimerov instituta neftekhimicheskogo sinteza Akademii Nauk SSSR (Laboratory for Polymer Rheology, /

Card 2/3

L 27903-65

ACCESSION NR: AP4012974

Institute of Petrochemical Synthesis, Academy of Sciences (SSSR)

SUBMITTED: 19Jul63

ENCL: 00

SUB CODE: 00, 00

NO REF SOV: 002

OTHER: 010

Card 3/3

KARGIN, V.A., akademik; AZORI, M.; PLATE, N.A.; BANDURYAN, S.I.

Direct electron microscope observation of polymerization processes  
in crystal monomers. Dokl. AN SSSR 154 no.5:1157-1159 F'64.

(MIRA 17:2)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.

ACCESSION NR: AP4019982

S/0020/64/154/006/1421/1424

AUTHOR: Vinogradov, G. V.; Malkin, A. Ya.; Plotnikova, Ye. P.;  
Kargin, V. A. (Academician)

TITLE: Thixotropy of polymers in viscous flow

SOURCE: AN SSSR, Doklady\*, v. 154, no. 6, 1964, 1421-1424

TOPIC TAGS: polymer thixotropy, polyisobutylene, thixotropy, shear strength, polymer structure recovery, relaxation, structure recovery kinetics, polyisobutylene P-20

ABSTRACT: Investigations were conducted with polyisobutylene P-20 (molecular weight 20,000 - Staudinger; 100,000 - Flory) to determine the existence of thixotropy in polymers and to show that reversible changes in their structures occur on reaching the shear strength prior to steady-state flow. The present work confirmed that deformation of polyisobutylene can be accompanied by thixotropic breakdown of its supramolecular structures which occurs on reaching the shear strength. The rate of structure recovery is much lower than the rate of decrease of stresses during relaxation. Orig. art. has: 4 figures.

Card 1/2



ACCESSION NR: AP4022725

S/0020/64/155/002/0422/0425

AUTHOR: Stesikov, V. P.; Ovchinnikov, Yu. V.; Kargin, V. A. (Academician)

TITLE: Effect of nonsolvent on the physico-mechanical properties of concentrated solutions of polymers.

SOURCE: AN SSSR. Doklady\*, v. 155, no. 2, 1964, 422-425

TOPIC TAGS: polymer property, acrylonitrile methacrylate copolymer, polymer solution property, property change, glass point temperature, strength, relative elongation, propylene carbonate solvent, dibutyl phthalate, supermolecular structure, polymer solubility.

ABSTRACT: The possibility of changing a wide range of the mechanical properties of concentrated solutions of polymers by changing the solubility of the polymers in a solvent system was investigated. The physico-mechanical properties of concentrated solutions of acrylonitrile-methacrylate copolymers (20% methacrylate) such as glass point temperature ( $T_g$ ) (fig. 1), strength and relative elongation.

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ACCESSION NR: AP4022725

gation during rupture (fig. 2) were determined using a solvent system having propylene carbonate as the low molecular solvent and dibutylphthalate as the nonsolvent. The polymer strength in the pure solvent is low, but it increases rapidly by adding 10-20% dibutylphthalate, and decreases thereafter upon separation of two macroscopic phases, namely a solution of a copolymer in a low molecular liquid and a solution of a liquid in a copolymer. The effect of the amount of nonsolvent on the glass point temperature is somewhat similar; at up to about 10% dibutylphthalate the glass point changes little, then rises sharply in the 10-20% range. In the first case, where the low molecular liquid combines well with the copolymer, the mechanical properties are determined by the primary structural units of the polymer-the polymeric chain. In the second case, above 10% nonsolvent, the mechanical properties are determined by the secondary structures-blocks of chains. This change occurs within very narrow dibutylphthalate limits. Thus the physico-mechanical properties of polymeric solutions are varied significantly within the limits of one and the same phase by changing their supermolecular structure, which is accomplished by changing the solubility

Card 2/4

ACCESSION NR: AP4022725

of the low molecular liquid. Orig. art. has: 2 figures

ASSOCIATION: Akademiya nuak SSSR (Academy of Sciences, SSSR)

SUBMITTED: 28Nov63

DATE ACQ: 08Apr64

ENCL: 01

SUB CODE: 00

NO REF SOV: 015

OTHER: 003

Card 3/4

SELIKHOVA, V.I.; MARKOVA, G.S.; KARVIN, V.A., akademik

Birefringence of form in spherulites and stretched polypropylene films. Dokl. AN SSSR 155 no. 3:666-667 Mr '64. (MLRA 17:5)

1. Fiziko-khimicheskiy institut im. I.Ye.Karpova.

RAPOPORT-MOLODTSOVA, N.Ya.; BOGAYEVSKAYA, T.A.; KORETSKAYA, T.A.;  
SOGOLOVA, T.I.; KARGIN, V.A., akademik

Fibrous structures and the formation of an isotactic polystyrene  
jelly. Dokl. AN SSSR 155 no. 5:1171-1173 Ap '64. (MIRA 17:5)

1. Fiziko-khimicheskiy institut im. L.Ya.Karpova.

KARGIN, V.A., akademik; EFENDIYEV, A.A.; BERESTNEVA, Z.Ya.

Electron microscope study of the structure of a copolymer of diethyl ester of vinylphosphinic acid and acrylic acid having complex-forming properties. Dokl. AN SSSR 155 no.6:1401-1403 Ap '64.  
(MIRA 17:4)

1. Fiziko-khimicheskiy institut im. L.Ya.Karpova.

SHREYNER, B.M., TUBOV, V.P., ZABAVIN, V.A., KARGIN, V.A., akademik

Effect of the phase state of diacetylene on the chemical structure  
of macromolecules formed during its polymerization. Dokl. AN  
SSSR 150 no. 2:396-399 My 1961. (DIMA 17:7)



PAPISOV, I. M.; PISARENKO, T. A.; PANASENKO, A.A.; KABANOV, V.A.;  
KARGIN, V. A., akademik

Nature of the initiator and the phase state of acetaldehyde as  
influencing the chemical structure of macromolecules formed during  
acetaldehyde polymerization. Dokl. AN SSSR 156 no. 3:664-672  
'64. (MIRA 17:5)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.

TOPCHYEVA, I.N.; LEVINA, R.Ya.; KABANOV, V.A.; KARGIN, V.A.,  
akademik

Stereospecific effects in interfacial polycondensation.  
Dokl. AN SSSR 156 no. 4:929-931 Je '64. (MIRA 17:6)

1. Morskoy gosudarstvennyy universitet im. M.V. Lomonosova.

ACCESSION NR: AP4040957

S/0020/64/156/005/1156/1158

AUTHOR: Kargin, V. A. (Academician); Sogolova, T. I.; Shaposhnikova, T. K.

TITLE: Control of the supramolecular structure of polymers by artificial seeding

SOURCE: AN SSSR. Doklady\*, v. 156, no. 5, 1156-1158

TOPIC TAGS: polymer, crystallizing polymer, polymer supramolecular structure, polypropylene, artificial seeding, isotactic polystyrene, indigo, polymer supramolecular structure control, polymer mechanical property control

ABSTRACT: The possibility of controlling the supramolecular structure of polymers by artificial seeding has been studied for a number of crystallizing polymers. Experiments conducted with polypropylene containing 1% finely divided isotactic polystyrene or indigo as seed showed that the desired supramolecular structures can be obtained by seeding polymer melts. The melting point of the seeds must be lower

Card 1/2

ACCESSION NR: AP4041406

S/0020/64/156/00/1406/1408

TITLE: The effect of artificial crystallization nuclei on the crystallization kinetics and mechanical properties of isotactic polystyrene

AUTHOR: Kargin, V. A.; (Academician); Sogolova, T. T.; Rapoport-Melodnikov, N. Ya.

SOURCE: AN SSSR. Doklady\*, v. 156, no. 6, 1964, 1406-1408 and facing p. 1406

TOPIC TAGS: polystyrene, isotactic polystyrene, amorphous polymer, crystallization, kinetics, mechanical property, artificial crystallization nucleus, fluorescein, quinacridone, indigo, alizarin, crystallization rate, microphotograph, structure, deformability, film strength, crystallization center

ABSTRACT: The effect of introducing fluorescein, quinacridone, indigo or alizarin to act as artificial crystallization nuclei in isotactic polystyrene was evaluated by the rate of crystallization and the resultant mechanical properties. Microphotographs showed that the addition of 2% fluorescein did not promote the growth of polystyrene crystals, while 2% indigo or quinacridone caused rapid

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ACCESSION NR: AP4041406

crystallization of polystyrene forming a film with fine spherulitic structures. Alizarin also promoted rapid crystallization of polystyrene, forming a film whose structure contained coarse coarsely spherulites of alizarin and polystyrene. Although alizarin dissolved in the polystyrene melt, it precipitated from the solution and crystallized much more rapidly than polystyrene, and its radial fibrillar spherulites acted as crystallization centers for the polystyrene. Polystyrene alone after 3 hours crystallization still had the mechanical properties of an amorphous material; with 2% indigo it crystallized in 15 minutes. Prolonged crystallization however reduced the deformability of the films somewhat--a phenomenon apparently associated with structural changes not discernible with the optical microscope. With the addition of 4% alizarin the deformability (to 300%) and film strength of polystyrene crystallized for 1-2 hours were retained. Hence the addition of artificial crystallization nuclei accelerated the crystallization of slowly crystallizing polymers and can be used to control their mechanical properties. Orig. art. has: 4 figures

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova  
(Physical-Chemical Institute)

Card

2/3

KARGIN, V.A., akademik; EFENDIYEC, A.A.; BERESTNEVA, Z. Ya.

Spontaneous formation of large oriented structures in a non-regular copolymer of the diethyl ester of vinylphosphinic acid and acrylic acid. Dokl. AN SSSR 157 no.1:125-126 J1 '64 (MIRA 17:8)

1. Fiziko-khimicheskiy institut im. L. Ya.Karpova.

L 16444-65 EWG(j)/EWI(m)/EPP(c)/EWP(j)/T/EWA(h) Fe-l/Pr-l/Peb AFWL/ASD(a)-5 RM  
 ACCESSION NR: AP4043552 S/0020/64/157/004/0948/0950

AUTHOR: Zubov, Yu. A.; Tsvankin, D. Ya.; Markova, G. S.; Kargin, V. A.  
 (Academician)

TITLE: Temperature-induced changes in the major period of oriented polymers

SOURCE: AN SSSR. Doklady\*, v. 157, no. 4, 1964, 948-950

TOPIC TAGS: oriented polymer, polyethylene, strain oriented polyethylene, low pressure polyethylene, polymer ordering, polymer orientation, crystallization

ABSTRACT: The major period (the maximum in intensity of the distribution of dispersed x-ray radiation) in strain-oriented low pressure polyethylene fibers was studied by low angle scattering in the temperature range from ambient to 116C. Wide angle dispersion indicated that the orientation of the strained polymer was high and that it did not change appreciably upon heating. Diffraction spectra were obtained and found to yield a recurring spectrum on the second and subsequent cycles which agreed with the cooling curve of the first cycle. The intensity of the heating curve of the first cycle increased continuously with increasing

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L 16444-65

ACCESSION NR: AP4043552

temperature. The other curves all showed a maximum in intensity for the major period near 100C. By keeping the scanning control fixed on the position of the major period and varying the temperature through a heating and cooling cycle, a reproducible reversible change was noted in the intensity of the major period. The initial irreversible change was explained as caused by a decrease in the density of the irregular regions leading to an improvement in the ordering of the polymer. The reversible changes in intensity (not exceeding about 10%) were explained as thermal expansion effects not involving any structural alteration. The reversible changes in the intensity maximum near 100C were due to the greater mobility of the irregular regions in comparison to the ordered regions, and the greater coefficient of dispersion in the irregular regions. Above 100C the molecular mobilities increased, differences in density between the ordered and irregular regions decreased and the intensity decreased. This study indicates that low angle scattering of x-rays can be used in studying crystallization processes and dynamics of molecular motion in polymers. / Orig. art. has: 3 figures and 1 table.

Card 2/3

I 16444-65

ACCESSION NR: AP4043552

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physical  
Chemical Institute)

SUBMITTED: 14Mar64

ENCL: 00

SUB CODE: GC, MT, GP

NO REF SOV: 002

OTHER: 002

Card 3/3

KARGIN, V.A., akademik; MALINSKIY, Yu.M.; RABINOVICH, A.L.; TRIFEL', B.Yu.

Strength of model specimens of unidirectional structures. Dokl.  
AN SSSR 157 no.6:1273-1275 Ag '64 (MIRA 17:9)

1. Fiziko-khimicheskiy institut im. L. Ya. Karpova i Institut  
khimicheskoy fiziki AN SSSR.

L 21066-65 EPT(c)/EPR/EPA(a)-2/EWP(j)/EWT(m)/T/EWP(v) Pg-4/Pr-4/Ps-4/  
Pt-10 ASD(i)-3 EM/WJ

ACCESSION NR: AP4044887

S/0020/84/157/006/1434/1437

AUTHOR: Kargin, V. A.; Malinskiy, Yu. M.; Rabinovich, A. L.; Trifel', B. Yu.

TITLE: On the strength of model specimens of unidirectional structures

SOURCE: AN SSSR, Doklady\*, v. 157, no. 6, 1984, 1434-1437

TOPIC TAGS: strength, unidirectional structure, glass plastic, stress strain distribution, optical polarization stress analysis

ABSTRACT: The authors made an attempt to estimate the distribution of stresses in a certain model of a heterogeneous system, such as glass-plastics, in order to find the main factors which determine the strength of the oriented materials. The experimental investigation was carried out by the optical-polarization method and the theoretical treatment with the Maxwell equation generalized by G. I. Gurevich (Tr. inst. fiz. Zemli AN SSSR #169, 60 (1959)) which relates the length of the sample to stresses, Hooke's modulus, time and certain elastic constants. It was found that there are, at the rupture location of the reinforcing

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L 21066-65

ACCESSION NR: AP4044887

elements, in the adjoining binding material, large concentrations of shearing stresses that may become the foci of the rupture of the next element. Approximations are given for the distribution of stresses and strains. Orig. art. has: 3 figures and 7 equations

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physical Chemical Institute) Institut khimicheskoy fiziki, Akademii nauk SSSR (Institute of Chemical Physics, Academy of Sciences, SSSR)

SUBMITTED: 19Feb84

ENCL: 00

SUB CODE: MT, GC

NO. REF SOV: 006

OTHER: 006

Core 2/2

L 16392-65 EWT(m)/EWF(j) Pc-4 SSD/AFWL/ASD(a)-5/ASD(m)-3/AS(mt)-2/AFETR RM  
 ACCESSION NR: AP5002049 S/0020/64/158/003/0697/0698

AUTHOR: Kargin, V. A. (Academician); Zharikova, Z. F.; Berasneva, Z. Ya.; Resteova, Ya. V.

TITLE: Study of the structure of crude and cured rubbers by the replica method

SOURCE: AN SSSR. Doklady, v. 158, no. 3, 1964, 697-698, and insert facing p. 698

TOPIC TAGS: rubber, crystallography, electron microscopy, vulcanization, molecular structure

Abstract: Isotactic polyisoprene and polybutadiene crude rubbers, sodium-butadiene rubber, vulcanizates of these rubbers with 3% thiuram, 5% zinc oxide, and 1% stearic acid, and vulcanizates of natural rubber of the same composition with various degrees of vulcanization (5, 40, and 110 min) were studied by the electron microscopic replica method (carbon replicas for the vulcanizates; two-stage lacquer-carbon replica for the crude rubbers). The investigation of the crude rubbers revealed the presence in the elastomers of structural formations in the form of random ribbons, finer for isoprene than polybutadiene. Spherulite-like structures were observed in the precooled rubbers, while in previous works only ribbon structures were observed in films prepared at room temperature indicating a promotion of crystallization.

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L 16392-65

ACCESSION NR: AP5002049

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processes in these rubbers by reduction of the temperature. The structures present in the raw rubbers were found to be preserved during the vulcanisation process. The authors note that the widespread idea of rubbers as homogeneous systems, consisting of random interlaced molecular chains, connected by chemical bonds, is only a very rough approximation. Orig. art. has 4 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute); Nauchno-issledovatel'skiy institut shinnoy promyshlennosti (Scientific Research Institute of the Tire Industry)

SUBMITTED: 19May64

ENCL: 00

SUB CODE: MT, NP

NO REF SOV: 004

OTHER: 000

JPRS

Card 2/2



L 12408-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 AFETR RM

ACCESSION NR: AP4047328

S/0020/64/158/004/0939/0941

AUTHOR: Kalashnikova, V. G.; Kazhdan, M. V.; Barstnava, Z. Ya.;  
Kargin, V. A. (Academician)

TITLE: Electron-microscope investigation of structural changes occurring in the thermal vulcanization of chloroprene rubbers

SOURCE: AN SSSR. Doklady, v. 158, no. 4, 1964, 939-941, and insert facing p. 940

TOPIC TAGS: chloroprene rubber, rubber, rubber crystalline structure, vulcanization, crystalline structure

ABSTRACT: A study has been made of ordering in vulcanizates. Nairit A and Neoprene AS chloroprene rubbers were used. Thermal vulcanization of thin rubber films was conducted in vacuum or in air at 153C for 5-60 min. Electron-microscope investigation showed that thermal vulcanization destroyed the initial crystalline structure of chloroprene rubbers. The rate of subsequent structure formation decreased with increasing vulcanization time. In vacuum, capacity for subsequent polymerization was much less marked than in air. An optimum vulcanization time existed at which crystallization proceeded considerably faster than in

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L 12408-65

ACCESSION NR: AP4047328

the initial sample and resulted in more perfect structures. In this case cross-links were formed every 400 atoms, on the average. The occurrence of crystallization is interpreted in terms of nonuniform cross-link distribution in the bulk of the polymer. Orig. art. has: 4 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute)

SUBMITTED: 16Jun64

ATD PRESS: 3123

ENCL: 00

SUB CODE: GC, MT

NO REF SOV: 003

OTHER: 001

Card 2/2

L 23530-65 EWT(m)/EPF(c)/ENP(j)/T Pc-4/Pr-1 RM

ACCESSION NR: AP5000920

S/0020/64/159/004/0885/0886

AUTHOR: Kargin, V. A. (Academician); Pakirov, S. Kh.; Bakeyev, N. F.

TITLE: New method of direct observation of the structure of polymer solutions in electron microscope

SOURCE: AN SSSR. Doklady, v. 159, no. 4, 1964, 885-886, and insert facing p. 845

TOPIC TAGS: polymer solution structure, electron microscope technique, replica preparation, polymer solution

ABSTRACT: There have been recently new ideas developed concerning the structure of amorphous polymers. The latter are assumed to be ordered systems built of chains forming packets (see the latest work by the authors in Vysokomolekul. Soedin. 5, 98 (1964)). In the present paper, the authors describe a new method of preparation of replicas for use in the electron microscope. A substance is used as a solvent which glasses easily on cooling, with the temperature of vitrification above the room temperature. After dissolution of the polymer, the

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L 23530-65

ACCESSION NR: AP5000920

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solution is cooled below  $T_g$ . Uniform glass is then formed in which the structure of the polymer is fixed (frozen in). The glass is cleaved, and from the surface a replica is made.  $\alpha$ -polybutylene with the viscosity 1.25 was investigated. The solvent was purified rosin with a softening temperature of about 75C. The electron-microscopic analysis shows that ordered supermolecular structures in the solution of polymers can be formed which consists of chain packets. Orig. art. has: 2 figures

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University)

SUBMITTED: 22Jul64

ENCL: 00

SUB CODE: MT, GC

NR REF SOV: 006

OTHER: 001

Card 2/2

L 19689-65 EWT(m)/EPF(c)/EWA(d)/EWP(j)/T/EWP(t)/EWP(v) P-4/Pr-4 APWL/  
ASD(a)-5/AS(mp)-2/ASD(m)-3/AFETR JD/WB/RM  
ACCESSION NR: AP5001519 S/0020/64/159/005/1117/1119

AUTHOR: Vasilevskaya, L. P.; Bakeyev, N. F.; Lagun, L. G.;  
Kozlov, P. V.; Kargin, V. A. (Academician)

TITLE: Effect of small amounts of surface-active-agent additives on  
the properties of crystalline polymers

SOURCE: AN SSSR. Doklady, v. 159, no. 5, 1964, 1117-1119, and insert  
facing p. 1118

TOPIC TAGS: polymer, crystalline polymer, Nylon 66, mechanical  
property, surface active agent, crystallization

ABSTRACT: A study has been made of the effect of small concentrations  
of surface-active additives on the morphology and properties of crystal-  
line polymers. This research was done because the addition of surface-  
active agents was regarded as a possible alternative method of control-  
ling polymer crystallization in order to produce materials with opti-  
mum mechanical properties. The materials used were poly(hexamethylene  
adipamide) (I), having a molecular weight of 30,000 and a melting  
point of 262°C, and the following surface-active dyes in 1/100 to  
1/1000 dye/polyamide ratio: 1,4-dihydroxyanthraquinone (II).

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L 79689-65

ACCESSION NR: AP5001519

1/1000 1,4-dimesidinoanthraquinone (III); and 1/1000 (IV) or 1/100 (V) 4-[(4-chlorophenyl)amino]-3-methyl-1,9-anthrapyridone. Crystallization was studied in films deposited from solution or from melts. Optical and electron microscopy, stress-strain testing, and linear crystallization ratio measurements were carried out. It was found that very small amounts (0.1%) of homogeneously distributed surface-active additives cause a sharp change in the crystallization rate and spherulite size and, as a result, in mechanical properties also (see Fig. 1 of the Enclosure). Orig. art. has: 3 figures.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 22Jul64

ENCL: 01

SUB CODE: OC, GC

NO REF SOV: 007

OTHER: 002

ATD PRESS: 3161

Card 2/3

L 19689-65

ACCESSION NR: AF5001519

ENCLOSURE 01 0

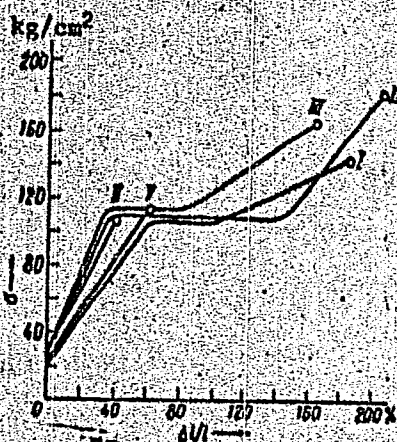


Fig. 1. Stress-strain curve for the pure polyamide (I) and for polyamide containing surface-active agents (II, III, IV, V)

Card 3/3



L 24233-65 EPF(o)/EWP(j)/EWT(m)/T Po-4/Pr-4 RM

ACCESSION NR: AF5001996

S/0020/64/159/006/1350/1353

AUTHOR: Bartenev, G. M.; Poyarova, Z. G.; Kargin, V. A. (Academician)

TITLE: Rheological properties and supramolecular structure of rubber-like polymers

SOURCE: AN SSSR. Doklady, v. 159, no. 6, 1964, 1350-1353

TOPIC TAGS: polyisobutylene, polyisobutylene flow, chemical flow, physical flow, rheological curve, supramolecular structure

ABSTRACT: The flow mechanism of linear polyisobutylene has been studied in view of the importance of rheological properties in the processing of polymers. The experiments were conducted in a rotary viscosimeter with linear PIB of a molecular weight of 900,000 at 60-120C and shear strain rates of 0-1 sec<sup>-1</sup>. A number of rheological curves (Figs. 1-4 of the Enclosure) are discussed. The abnormal shape of these curves could not be ascribed to "chemical" flow (degradation) because the molecular weight of the polymers and the activation energy of viscous flow remained unchanged under different experimental conditions. The fact that the flow is "physical" in nature was considered

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Card 2/6

MALINSKIY, Yu. M.; TRIFEL, B. Yu.; KARGIN, V. A.

"Examinations of overstresses on the boundary glass-plastic in reinforced plastics."

report submitted for 1st Intl Cong, Glassfiber-Reinforced Plastics & Epoxy Resins, Berlin-Adlershof, E. Germany, 22-27 Mar 65.



L 55048-65 EWT(m)/ESP(c)/ENP(j)/T Po-4/Pr-4 RM

ACCESSION NR: AP5012422

UR/0374/65/000/002/0003/0008  
678:539.376

AUTHORS: Shteding, M. N. (Moscow); Kargin, V. A. (Moscow)

TITLE: Determining the frost resistance of polymeric materials and films by the thermomechanical method

SOURCE: Mekhanika polimerov, no. 2, 1965, 3-8

TOPIC TAGS: thermomechanical property, polymer, polyvinyl chloride, temperature dependence / deformometer

ABSTRACT: The authors demonstrate the possibility of using the temperature dependence of deformation in uniaxial stretching of polymers at low temperatures as a quick and sensitive method of determining frost resistance. They used a device called a deformometer, developed at the Physicochemical Institute by Yu. M. Malinskiy and G. L. Slonimskiy (Zav. lab., 1956, 10, 247), permitting measurements of tensional stress in the temperature range from -80 to 200C. The test samples were frozen in the apparatus to complete loss of strain, and the temperature was then steadily increased at set intervals of time (3 min, 5 min) and the strain measured. Tests were made on polyvinyl chloride with different contents

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L 55048-65

ACCESSION NR: AP5012422

of four plasticizers: dibutyl phthalate, dioctyl phthalate, dioctyl sebacate, and dibutyl sebacate. The optimal quantities of plasticizers and fillers and the efficiency of these materials may be thus evaluated. Results indicate that the method is very satisfactory, and it is concluded that it may be used for studying polymer structures and for industrial controls. Orig. art. has: 5 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 12Dec64

ENCL: 00

SUB CODE: 00, TD

NO REF SOV: 008

OTHER: 004

*AL*  
Card 2/2

L-24119-65 EPI(c)/EWP(j)/ENT(m)/I Pc-4/Pr-4 RM

ACCESSION NR: AP5003827

S/0190/65/007/001/0050/0054

AUTHOR: Bort, D. N.; Rylov, Ye. Ye.; Okladnov, N. A.; Shtarkman, B. P.; Kargin, V. A.

TITLE: Morphology of bulk poly(vinyl chloride)

SOURCE: Vysokomolekulyarnyye soedineniya, v. 7, no. 1, 1965, 50-54

TOPIC TAGS: polymerization, bulk poly(vinyl chloride), supramolecular structure

ABSTRACT: The formation of supramolecular structures (morphological forms) in the course of polymerization and their development with an increasing degree of conversion has been studied during bulk polymerization of poly(vinyl chloride). The polymerization was conducted at 18—22C in ampoules which made sampling possible at any stage of polymerization. The structure of the sample and the particle size were determined by electron microscopy. Depending on the degree of conversion, the polymerization product was an opalescent liquid (traces of polymer), a white suspension (conversion, 1—25%), a gel (conversion, 25—60%), or a solid block (conversion, 60—90%). Electron micrographs

Cord 1/2

L 24119-65

ACCESSION NR: AP5003827

indicate that the polymer is formed in spherical particles of approximately equal size. During polymerization the concentration of the particles remains constant, but the particles grow as a result of polymer formation on their surface and aggregate into a solid block. At first the block is not transparent because of the presence of a system of pores between the spherical particles. Further polymerization of the monomer between these particles results in the formation of a transparent region at the bottom of the block. The first supra-molecular structures appear when the concentration of macromolecules attains a critical value, at which time their association sets in. Orig. art. has: 7 figures. [B0]

ASSOCIATION: none

SUBMITTED: 02Mar64

ENCL: 00

SUB CODE: 00, 00

NO REF SOV: 003

OTHER: 000

ATD PRESS: 3176

Card 2/2

L-24120-65 EPR(c)/EPR/EWP(j)/EWI(m)/I/EWP(v) PC-4/Pr-4/PS-4 RM/WW  
ACCESSION NR: AP5003835 S/0190/65/007/001/0135/0140

AUTHOR: Shtarkman, B. P.; Voyutskiy, S. S. Kargin, V. A. B

TITLE: Cohesion of polyethylene

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 1, 1965,  
135-140

TOPIC TAGS: crystalline polymer, polyethylene, cohesion, supramolecular structure

ABSTRACT: The cohesion of crystalline polymers has been studied with high- and low-pressure polyethylene (HPPE and LPPE) by stripping tests. The tests were conducted with polyethylene films doubled with fabrics and pressed between heated plates at 0.5 kg/cm<sup>2</sup>. The effect of contact time and contact temperature (given a constant contact time) was determined. In order to establish the effect of supramolecular structures (morphology) on cohesion, the structure of the specimens was determined by x-ray diffraction and optical microscopy. The results of the study are given in the form of plots showing the relationship between cohesion and contact time, and cohesion and con-

Card 1/4

L 24120-65  
ACCESSION NR: AP5003835

tact temperature (see Figs. 1—3 of the Enclosure). The breaks on the curves in Fig. 1 correspond to the melting points of HPPE (105C) and LPPE (130C). Appreciable cohesion appears for HPPE at 81C and for LPPE at 96C. Individual macromolecules in the stronger and better ordered supramolecular structures of LPPE are less free to diffuse from one film to another and to form cohesive bonds. The curves in Fig. 3 indicate that the cohesion of specimens having a fine supramolecular structure (without heat treatment) is higher than that of specimens having a coarse supramolecular structure (heat-treated specimens). However secondary supramolecular structures (spherulites) affect cohesion less than ordering within the primary supramolecular structures (or sheaves). Orig. art. has: 1 figure and 1 table.

[B0]

ASSOCIATION: none

SUBMITTED: 25Mar64

ENCL: 02

SUB CODE: 00, 60

NO REF SOV: 011

OTHER: 003

ATD PRESS: 3176

Card 2/4



L 24120-65

ACCESSION NR: AP5003835

ENCLOSURE: 01

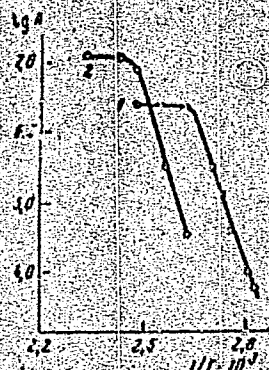


Fig. 1. Relationship between cohesion and contact temperature

1 - LPPE; 2 - HPPE.

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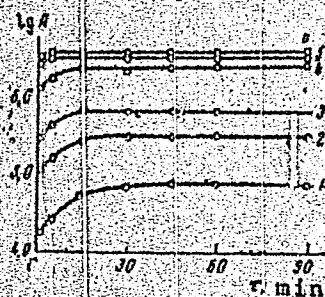


Fig. 2. Relationship between cohesion and contact time for HPPE, Temperature

1 - 95°C; 2 - 97°C; 3 - 100°C;  
4 - 103°C; 5 - 110°C; 6 - 120  
to 130°C.

L 24120-65

ACCESSION NR: AP50038/5

ENCLOSURE: 02

0

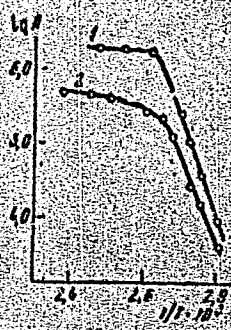


Fig. 3. Relationship between cohesion and contact temperature for HPPB

1 - Without heat treatment;  
2 - after heat treatment.

Cord 4/4



L-24121-65 EPF(c)/EPR/EWP(j)/EWT(m)/I/EWP(v) Pc-4/Pr-4/PS-4 RM/WW  
 ACCESSION NR: AP5003836 S/0190/65/007/001/0141/0144

38  
 β

AUTHOR: Shtarkman, B. P.; Voyutskiy, S. S.; Kargin, V. A.

TITLE: Cohesion of polystyrene

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 1, 1965, 141-144

TOPIC TAGS: polystyrene, atactic polystyrene, isotactic polystyrene, amorphous polymer, crystalline polymer, cohesion, supramolecular structure

ABSTRACT: The cohesion of amorphous and crystalline isotactic polystyrene (IPS) and of atactic polystyrene (APS) has been studied at room temperature by stripping tests in bonded polystyrene films. In order to establish the effect of supramolecular structures (morphological forms) on cohesion, the structures of the specimens were determined by x-ray diffraction and electron and optical microscopy. The results of the study are given in a form which shows the relationship between the cohesion and banding temperature (see Fig. 1 of the Enclosure). A study of the results showed that the bonding temperature at which cohesion commences is: for APS, 78—80C; for amorphous

Card 1/3

L 24121-65

ACCESSION NR: AP5003836

IPS, 90—92C; and for crystalline IPS, 157—160C. The relatively poorer cohesion of crystalline IPS was attributed to the higher degree of ordering of its primary supramolecular structures and to the formation of spherulites. Amorphous IPS exhibits lower cohesion than APS because the structure of amorphous IPS has a higher degree of order in the amorphous state owing to the high regularity of the IPS backbone. Orig. art. has: 6 figures. [B0]

ASSOCIATION: none

SUBMITTED: 25Mar64

ENCL: 01

SUB CODE: OC,GC

NO REF SOV: 007

OTHER: 001

ATD PRESS: 3176

Card 2/3

1. 24121-65

ACCESSION NR: AP5003836

ENCLOSURE: 01

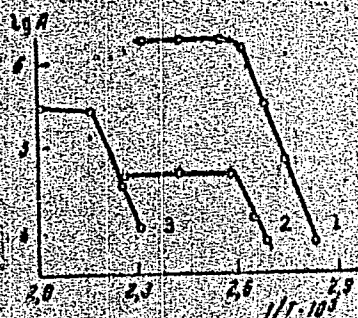


Fig. 1. Relationship between the cohesion and the bonding temperature

1 - Atactic polystyrene; 2 - amorphous isotactic polystyrene; 3 - crystalline isotactic polystyrene.

Card 3/3

L 44166-65 EHC(b)-2/EPT(c)/EWT(1)/EWT(m)/EWP(j)/Pc-4/PR-4/P1-4 IJP(c)

ACCESSION NR: AP5005586 00/RM S/019C/65/007/002/0215/0219

AUTHORS: Selikhova, V. I.; Zubov, Yu. A.; Markova, G. S.; Kargin, V. A.

TITLE: Microscopic and x-ray investigation of polypropylene crystals

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 2, 1965, 216-219, and insert facing p. 215

TOPIC TAGS: polypropylene, crystal growth, polymer

ABSTRACT: To continue the work of V. A. Kargin, N. F. Bakeyev, Li Li-Shen, and G. S. Ochapovskaya (Vysokomolek. soyed. 2, 1280, 1960); A. Keller (Polymer 3, 393, 1962), and others, large crystals of isotactic polypropylene (PP) were grown by slow cooling (from 1650 at 2 degrees/hr) of concentrated PP (m. w. = 120 000) solutions (1% in a mixture of 3 parts xylene and 1 part silicone oil). X-ray structural studies were then performed. After a preliminary microscopic observation, the crystals were placed on the diaphragm of an x-ray chamber with an aperture of 0.16 mm, and x-ray pictures of the crystal were taken in three directions. They are shown schematically in Fig. 1 on the Enclosure. The most prominent reflections were 111, 110, 131, 040, while reflections 130, 220, and 022 were very weak. The positions of these reflections indicate a complicated

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L 44166-65

ACCESSION NR: AP5005586

2

structure. The orientations of the a,b,c axes (see Fig. 1 on the Enclosure) show that b coincides with the direction of the smallest edge of the crystal, while a and c are located in the plane of the large face of the crystal at an angle of  $\sim 10^\circ$  with the diagonals of this face. Observation in a polarization microscope revealed a fine structure of the crystals, consisting of fibrillar formations (stretched plates) located along the large diagonal faces. The x-ray photographs indicate that in the individual crystal fibrils the molecular chains are located at an angle of either  $90^\circ$  or  $10^\circ$  with the fibril axes. The authors stipulate that the observed structures correspond to dendritic crystals which grow similarly to those described by V. A. Kargin and I. I. Gorina (Vysokomolek. soed. 7, 220, 1965). The authors thank D. Ya. Tsvankin for his help in interpreting the results. Orig. art. has: 5 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-Chemical Institute)

SUBMITTED: 21Mar64

ENCL: 01

SUB CODE: 55,0C

NO REF SOV: 006

OTHER: 006

Card 2/3



L 44168-65 EEJ(b)-2/EPF(c)/EWP(j)/EWT(1)/EWT(m)/T Pc-4/Pr-4/Pi-4

IJP(c) GG/RM

ACCESSION NR: AP5005587

S/C190/65/007/002/0220/0223

AUTHORS: Kargin, V. A.; Gorina, I. I.

TITLE: Dendritic growth of crystals of isotactic polypropylene

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 2, 1965, 220-223

TOPIC TAGS: crystal growth, crystal, polypropylene, polymer

ABSTRACT: The work described by V. A. Kargin and G. P. Andrianova (Dokl. AN SSSR, 146, 1337, 1962) and by G. P. Andrianova, N. F. Bakeyev, and V. A. Kargin (Dokl. AN SSSR, 150, 331, 1963) has been continued by investigating the crystallization of polymers (polypropylene with  $m. w. = 100,000$  and melting temperature of  $165^{\circ}\text{C}$ ) using electron-microscopic techniques. In particular, the development of dendritic forms in crystalline polymers was of interest. Electron microscope investigations of polypropylene solutions crystallized under isothermal conditions ( $90^{\circ}\text{C}$ ) and under slow cooling conditions showed long thin fibrils of  $100 \text{ \AA}$  diameter, occasionally with branches at right angles to the fibril. When only the temperature conditions of crystallization were changed, a large number of different branch- and needle-shaped dendritic crystals were obtained. The same processes were observed during isothermal crystallization of thin polypropylene

Card 1/2

L 44168-65

ACCESSION NR: AP3005587

films on glycerine surfaces (at 125, 128 and 130C), in which case fibril bands with branching teeth (consisting of 100 Å diameter fibrils) were observed. Depending on the relative growth rates of the trunks and branches and the frequency of new branch formation (which can be varied by changing the crystallization conditions), a variety of growth patterns was observed. It was found that the dendritic crystallization of three-dimensional crystals proceeded by successive plane formations which, in contrast to the familiar polyethylene dendrites formed from rhombic flats, were built up of constant diameter ( $\approx 100$  Å) fibrils. Orig. art. has: 13 figures.

ASSOCIATION: Institut neftekhimicheskogo sinteza (Institute of Petrochemical Synthesis)

SUBMITTED: 23Mar64

ENCL: 00

SUB CODE: 55, OC

NO REF SOV: 005

OTHER: 002

A30  
Card 2/2

L 27190-65 EWT(m)/EPT(c)/EPR/EWP(j)/T Po-L/Pr-L/Ps-L RPL WA/EM

ACCESSION NR: AP5005589

S/0190/65/007/002/0226/0228

AUTHOR: Kargin, V. A.; Litvinov, I. A.

TITLE: Structural changes during the heat treatment of polyacrylonitrile

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 2, 1965, 226-228

TOPIC TAGS: polyacrylonitrile, pyrolyzed polyacrylonitrile, organic semiconductor, semiconducting polymer, pyrolysis, heat treatment, morphology, chemical structure

ABSTRACT: For the first time, structural changes in the course of pyrolysis up to 800C have been followed in a polymer, namely polyacrylonitrile. Pyrolysis was carried out in vacuum for oriented and non-oriented films and fibers of the polymer. Electron microscopy showed that the initial morphology of crystalline polyacrylonitrile can be preserved in pyrolysis. X-ray structural analysis showed that in the pyrolysis of oriented and nonoriented polyacrylonitrile, the initial degree of orientation is preserved while the chemical structure of

Card 1/2



L 27190-65

ACCESSION NR: AP5005589

the polymer is converted to cyclic. Pyrolysis conditions were selected so that the temperature at any particular time would be below the temperature at which marked changes in the morphology of the newly formed polymer could take place. Orig. art. has: 3 figures. [SM]

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis, AN SSSR)

SUBMITTED: 31Mar64

ENCL: 00

SUB CODE: OC, GC

NO REF SOV: 004

OTHER: 000

ATD PRESS: 3101

Card 2/2

L-27626-65 EWT(m)/EPA(s)-2/EPT(c)/T/EWP(j)/EPR/EMA(c) Pc-1/Pr-1/Ps-1/Pt-10 RPL  
 ACCESSION NR: AP5005590 WU/RM S/0190/65/007/002/0229/0231

AUTHOR: Kargin, V. A.; Sogolova, T. I.; Shaposhnikova, T. K.

TITLE: Use of artificial crystallization nuclei for producing anisodiametric morphological forms in crystallizing polymers

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 2, 1965, 229-231

TOPIC TAGS: crystallizing polymer, polyurethan, artificial seeding, anisodiametric particle, morphological form, polymer strength

ABSTRACT: It has been shown that artificial seeding of crystallizing polymers with acicular particles of high-melting organic compounds makes it possible to produce anisodiametric morphological forms and increase the strength of polymers. The experiments were conducted with polypropylene (PP) solutions and melts. Introduction of hexachlorobenzene (HCB) into xylene solutions of PP followed by evaporation of the solvent and sublimation of HCB at 140C yielded PP films which contained anisodiametric structures (bands of spherulites). However, sublimation of the seeds loosened the structure of PP and adversely affected the strength of the films. Incorporation of 0.5—3.0% alizarin into xylene solutions of PP followed by evapora-

Card 1/2

L 27626-65

ACCESSION NR: AP5005590

tion of the solvent at 140C and melting of the deposited films at 210C, or direct incorporation of alizarin into PP melts at 210C followed by a slow cooling of the melt to 20C, also yielded PP films which contained bands of spherulites. Study of the stress-strain curves of films prepared from melts showed that alizarin increases PP strength by about 50%. Orig. art. has: 5 figures. [B0]

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute)

SUBMITTED: 01Apr64

ENCL: 00

SUB CODE: 0C, 0G

NO REF SOV: 006

OTHER: 000

ATD PRESS: 3190

Card 2/2

1 57547-65 EWT(m)/EPF(c)/ENP(v)/EPR/ENP(j)/T Pc-4/Pr-4/Ps-4 WW/RM

ACCESSION NR: AP5016884

UR/0374/65/000/003/0063/0067  
670:532.096

AUTHOR: Malinskiy, Yu. M. (Moscow); Prokopenko, V. V. (Moscow); Kargin, V. A. (Moscow)

TITLE: Temperature dependence of the strength of adhesive joints involving crystalline polymeric adhesives

SOURCE: Mekhanika polimerov, no. 3, 1965, 63-67

TOPIC TAGS: adhesive, adhesive strength, adhesive joint, polymer, crystalline polymer

ABSTRACT: A study has been made of the temperature dependence of the strength of adhesive bonds involving crystalline polymers. Adhesive joint specimens were prepared using steel or duralumin substrates and the "mixed polyamide-4,5,8" [not further identified] or gutta percha unfilled or filled with corundum. The polymer was applied as a solution, after which the specimen was dried in air, and subjected to elevated temperatures and compressive loads (100--175C, 35--80 kg/cm<sup>2</sup>). Stripping tests were then carried out. It was found that in the absence of filler, failure is adhesive, while when filler is used, it is adhesive in about half of the

Card 1/2

L 57547-65

ACCESSION NR: AP5016884

specimens and cohesive in the other half. Curves of adhesive strength versus temperature go through two peaks, one near the glass-transition temperature ( $T_g$ ) of the adhesive and the other near its melting point ( $T_m$ ). The peak near  $T_g$  was considered as confirming the significant effect of passage through the glass region on the mechanical properties of crystalline polymers. The peak in the vicinity of  $T_m$  was shown to be due to polymer recrystallization at the apex of the growing crack where the excess stress was concentrated. The two peaks are present both in the case of adhesive failure and in that of cohesive failure. It was also shown that the filler lowers the stress value at which recrystallization of the gutta percha occurs. Orig. art. has: 5 figures. [SM]

ASSOCIATION: none

SUBMITTED: 11Jan65

ENCL: 00

SUB CODE: MT

NO REF SOV: 006

OTHER: 000

ATD PRESS: 4039

Card *2/2*



L 36229-65 EWT(m)/EPF(c)/EWP(j)/1 Pc-4/Pr-4 RM  
 ACCESSION NR: AP5008360 8/0190/65/007/003/0385/0388 26

AUTHOR: Kargin, V. A.; Sogolova, T. I.; Shaposhnikova, T. K. 24  
 15B

TITLE: Nucleation mechanism of the action of solid particles in crystallizing  
polymers 9

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 3, 1965, 385-388

TOPIC TAGS: seeding, morphological form, supramolecular structure, heterogeneous  
 nucleus, polymer

ABSTRACT: Seeding polymers with heterogeneous crystallization nuclei (inert solid  
 compounds whose melting point is above that of the polymer) is an effective method  
 of controlling the morphological forms (supramolecular structures) of polymers.  
 Study of the nucleation mechanism showed that seeding causes stresses in the po-  
 lymer-nucleus boundary layer. These stresses can be observed in a polariscope as  
 a luminous contour. Stresses result in the formation of microscopic oriented  
 polymer sections at the polymer-nucleus boundary. These sections favor crystalli-  
 zation and formation of supramolecular structures as the melt cools. The results  
 of an investigation of the nucleation mechanism with a number of polymers and  
 different seeds are described in this paper. It was shown that the magnitude of

Card 1/2

L 76-29-65

ACCESSION NR: AP5008360

stresses caused by artificial crystallization of nuclei depends on their size, on the nature of the polymer and nucleus, and on the nature of their interaction. The authors think that it is possible to seed with nuclei which react chemically with the polymer. The microscopic ordering of polymer sections caused by stresses is unstable; supramolecular structures formed on the nuclei were shown to break down irreversibly at temperatures above the melting point of the polymer when the nuclei were removed (e.g., by sublimation for the case of polypropylene seeded with hexachlorobenzene). Orig. art. has: 4 figures. [BO]

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpov (Physicochemical Institute)

SUBMITTED: 01Apr64

ENCL: 00

SUB CODE: 00,55

NO REF BOV: 002

OTHER: 000

ATD PRESS: 3220

Card 2/2 30

L 35435-65 EPP(c)/EPR/EWT(d)/EWT(m)/T/EWP(w) Pc-4/Pr-4/Ps-4 EM/EM/VM

ACCESSION NR: AP5008362

S/0190/65/007/003/0394/0396

AUTHORS: Kargin, V. A., Sogolova, T. I.; Pavlichenko-Krasnikova, N. P.

TITLE: On the characteristics of irreversible deformations in crystalline polyolefins

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 3, 1965, 394-396

TOPIC TAGS: polyolefin, deformation mechanism, stress relaxation, polypropylene, polymer, polyisobutylene, defect formation, material failure / MIN 8 microscope, MIN EM microscope

ABSTRACT: An experimental study of the relaxation phenomena in crystalline polyolefins under stress and at high temperatures was conducted. Specimens of polypropylene were melted at 180C, and films  $\approx 20\mu$  thick were held for various periods at 140C. They were then studied under polarized light with an MIN-8 microscope. The spherulites were found to increase in size (reaching 700-800 $\mu$  in 4 hours) and to acquire numerous defects. Films 700 $\mu$  thick studied under a metallographic microscope MIN-8M showed surface spherulites with radial cracks upon being heated at 140-160C. No surface spherulites were found in specimens heated at lower temperatures, but all the specimens held at 60-160C acquired

Card 1/2



L 35435-65

ACCESSION NR: AP5008362

3

crystal-like formations. The study showed that the irreversible deformation is brought about by the translocation of large structural elements and that tension cracks lead to the failure of crystalline polypropylene. Stress relaxation was found to be complicated by structural changes leading to the formation of defects. Introducing polyisobutylene into polypropylene diminishes the number of cracks. (Abstracter's note: original article includes references to 5 figures, none of which are shown).

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR im. A. V. Topchiyeva  
(Institute of Petrochemical Synthesis, AN SSSR); Fiziko khimicheskiy institut  
im. L. Ya. Karpova (Physico-chemical Institute)

SUBMITTED: 04Apr64

ENCL: 00

SUB CODE: 00

NO REF SOV: 005

OTHER: 000

Card 2/2

L 43097-65 DMT(m)/EWP(j)/T Pc-1 RM

ACCESSION NR: AP5008366

S/0190/65/007/003/0420/0422

AUTHORS: Konstantinopol'skaya, M. B.; Berestneva, Z. Ya.; Kargin, V. A.

TITLE: Structuration of a polyamide copolymer

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 3, 1965, 420-422

TOPIC TAGS: polyamide, copolymer, structuration kinetics, vinyl, ethylglycol, crystal, fibrillar structure, spherulite/ JEM 5J electron microscope

ABSTRACT: An experimental investigation was conducted on the structuration process in polyamide copolymers (nylon 6,6,6<sup>6</sup> and 6,10). Electron microscope JEM-5J was used, and the specimens were prepared by pouring a hot solution of the copolymer onto a charcoal plate at various temperatures. It was determined that the molecular weight had no bearing on the structuration process, but that the latter was conditioned by the temperature at which the specimens were prepared and by the type of solvent. Types of structures (spherulites, fibrils, plates) originating from ethylglycol solutions at various temperatures are discussed (Abstracter's note: several illustrations are mentioned but not shown in the text). These structural elements were studied after being etched with formic acid. The fibrillar structures were found to occur at all temperatures of specimen preparation and are also present

Card 1/2

L 43097-65

ACCESSION NR: AP5008366

in the crystals. Etching made it possible to isolate elementary components of fibrillar formations, 100 Å in width.

ASSOCIATION: Fiziko-khimiicheskiy institut im. L. Ya. Karpova (Physico-Chemical Institute)

SUBMITTED: 06May64

ENCL: 00

SUB CODE: 00

NO REF SOV: 002

OTHER: 003

*B/R*  
Card 2/2

L 44172-65 EPP(c)/EPR/ENT(m)/ENR(j)/T Po-4/Pr-4/Ps-4 W17/RM

ACCESSION NR: AP5011243

UR/0190/65/007/004/0576/0579

AUTHOR: Kargin, V. A.; Sogolova, T. I.; Rapoport-Molodtsova, N. Ya.

TITLE: Structure formation in and mechanical properties of plasticized isotactic polystyrene in the presence of artificial crystallization nuclei

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 4, 1965, 576-579, and insert facing p. 576

TOPIC TAGS: isotactic crystalline polystyrene, brittle polystyrene mechanical property, nonbrittle polystyrene

ABSTRACT: The brittleness of isotactic crystalline polystyrene (1) hampers industrial application of this material. Attempts to reduce the brittleness by plasticization resulted in a sharp drop in mechanical strength because of the formation of large morphological forms (supramolecular structures) and distribution of the plasticizer between individual structural elements, which hinders their aggregation. This study was undertaken to improve the mechanical properties of 1 by addition of artificial crystallization nuclei to melts of the

Card 1/3

L-44172-65

ACCESSION NR: AP5011243

polymer. These nuclei hinder the growth of large supramolecular structures. The experiments were conducted with films of I plasticized with 2.5 to 12 mol% dioctyl phthalate or dibutyl sebacate with 2% indigo crystals added. It was shown that the mechanical properties of I depend on the amount of plasticizer, and that there exists an optimum plasticizer concentration which insures comparatively good mechanical properties. For the case of dioctyl phthalate this concentration is 4.5 mol% (tensile strength, 286 kg/cm<sup>2</sup> at 20C and 110 kg/cm<sup>2</sup> at 110C). The mechanical properties of this material can be further improved by slow heating to 230C (tensile strength, 425 kg/cm<sup>2</sup> at 20C and 125 kg/cm<sup>2</sup> at 110C). Heat treatment promotes uniform distribution of the plasticizer in specimens and produces fine changes in this supramolecular structure. Part of the plasticizer evaporates in the course of heat treatment, which reduces its concentration to 2.7 mol%. However, initial introduction of only 2.7 mol% dioctyl phthalate in the polymer causes brittle films. Thus, introduction of artificial crystallization nuclei into I is an effective method of reducing the brittleness of the material without lowering its mechanical strength. Production of nonbrittle I is a prerequisite for its broad industrial use. Orig. art. has: 2 figures and 1 table.

Cord 2/3

[BO]



L 44172-65

ACCESSION NR: AP5011243

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova  
(Physico-Chemical Institute)

SUBMITTED: 06Apr64

ENCL: 00

SUB CODE: dC, Gc

NO REF SOV: 004

OTHER: 000

ATD PRESS: 3241

Card 3/3

L 45410-65 EWP(j)/EWT(m)/T Pc-4 RM

ACCESSION NR: AP5011247

UR/0190/65/007/604/0638/0641

AUTHORS: Malinskiy, Yu. M.; Guzeyev, V. V.; Kargin, V. A.TITLE: Deformation of polypropylene fiberSOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 4, 1965, 638-641

TOPIC TAGS: polypropylene, fiber, temperature dependence, thermal expansion, heat treatment / Moplen polypropylene

ABSTRACT: In order to determine the correction for thermal linear expansion, the temperature dependence of the length of polypropylene fibers was studied. Two types of fibers were examined: some stretched to 7.6 times, some to 12 times their original lengths. The first were obtained from Moplen polypropylene. They were stretched in glycerin at 120C at a rate of 35 m/min. The fibers were washed from the glycerin by water at 50C. The second type of fibers was obtained from the first at 140C in nitrogen at a rate of 15% per minute. The fibers were heat-treated at constant lengths at 100C for 3 hours and were then set at 45C for 9-10 hours. The first type of specimen had a sp gr of 0.903, the second 0.906. The temperature dependence of length was then measured. Specimens of the first type had a coefficient of linear thermal expansion near zero,

Card 1/2

L 45410-65

ACCESSION NR: AP5011247

2

and specimens of the second type showed a reversible contraction on heating. Results thus show that increase in stretching leads to increase in reversible contraction during heating. With increase in crystallinity, the amount of contraction declines. Fibers heat-treated for 3 hours contracted less than those treated for 1 hour. The entropy component in the recovery force proved to be less than 40%. The amount of this contribution and the sign are functions of the strain and the amount of stretching. This fact indicates that antibonding and disordering are important factors during deformation of oriented crystalline polymers. "The authors express their sincere thanks to V. S. Klimenkov for kindly furnishing the specimens." Orig. art. has: 5 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute)

SUBMITTED: 07Jun64

ENCL: 00

SUB CODE: 00, MT

NO REF SOV: 005

OTHER: 000

Card 2/2 MB



PAVLYUCHENKO, G.M.; GATOVSKAYA, T.V.; KARGIN, V.A.

Effect of the chemical nature of the sorbate on the sorption capacity of crystalline polymers. Vysokom. soed. 7 no.4:647-649 Apr '65. (MIRA 13:6)

L. Nauchno-issledovatel'skiy fiziko-khimicheskiy institut imeni Karpova, Moscow.

L 54863-65 EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4 RPL WW/RM

ACCESSION NR: AP5016502

UR/0190/65/007/006/C998/0999  
678.01:53+678.744

AUTHOR: Konstantinopol'skaya, M. B.; Kanevskaya, Ye. A.; Karyakina, M. I.; Berestneva, Z. Ya.; Kargin, V. A.

TITLE: Structure of butyl methacrylate-methacrylic acid copolymer

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 6, 1965, 998-999, and insert facing p. 959

TOPIC TAGS: butyl methacrylate, methacrylic acid, copolymer, elastomer structure, ribbon like structure, varnish coating, varnish coating structure

ABSTRACT: An earlier study (Kalashnikova, V. G., M. V. Kazhdan, Z. Ya. Berestneva, and V. A. Kargin. Vysokomolekulyarnyye soyedineniya, v. 6, no. 5, 1964, 906-909) showed that certain elastomers are ordered systems whose structure consists of ribbons 1000 Å thick. In this study an attempt was made to show that in polymers, in general, ribbon-like structures are associated with the high-elastic state. The experiments were conducted with the straight-chain amorphous butyl methacrylate-methacrylic acid copolymer BMK-5 (carbonyl group content, 5%; glass temperature ( $T_g$ ), 40°C). Electron microscopic investigation of thin BMK-5 films heated at

Card 1/2

L 54863-65

ACCESSION NR: AP5016502

80—180C for 2 hr and rapidly cooled revealed the formation of ribbon structures. It was concluded that ribbon-like structures are, apparently, inherent in all polymers in the high-elastic state, provided that their decomposition temperature is much higher than their  $T_g$ . Study of the morphology of surfaces of BMK-5-based varnish films treated in a similar manner yielded analogous results. Thus, structure formation in these films takes place at temperatures above the polymer's  $T_g$  and results in randomly distributed ribbon-like structures. Investigation of the structure of varnish coatings in the course of their aging at 450 for two days showed that aging at comparatively low temperatures does not affect the structure of the coatings but favors the development of defects on the film surface. However, prolonged aging could also cause structural changes and adversely affect the properties of the coatings. Orig. art. has: 5 figures. [B0]

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute); Gosudarstvennyy nauchno-issledovatel'skiy proyektnyy institut lako-krasochnoy promyshlennosti (State Design and Planning Scientific Research Institute of the Varnish and Paint Industry)

SUBMITTED: 07Jul64

ENCL: 00

SUB CODE: MT, CC

NO REF SOV: 003

OTHER: 000

ATD PRESS: 4031

Card 2/2 gm

L 62617-65 EWT(m)/EPF(c)/EWP(1)/T Pc-4/Pr-4 RM

ACCESSION NR: AP5018427

UR/0190/65/007/007/1173/1178  
66.095.264+678.744

AUTHOR: Nadzhimutdinov, Sh.; Cherneva, Ye. P.; Kargin, V. A.

TITLE: Study of the cationic polymerization of diphenylketene and vinyl acetate to obtain a complex-forming polymeric material

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 7, 1965, 1173-1178

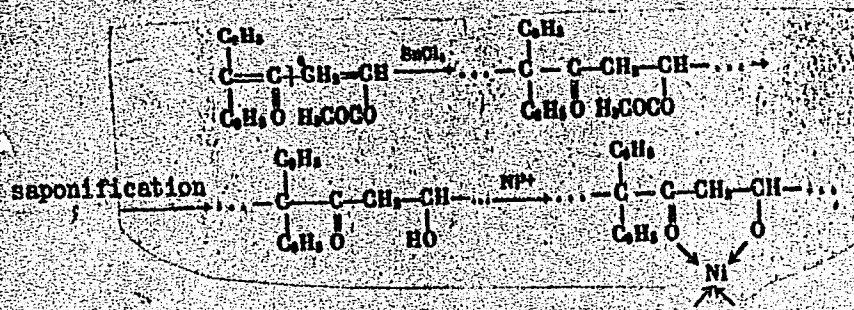
TOPIC TAGS: complex forming polymer, polyelectrolyte, ion exchange, ion exchange resin, coordination polymer

ABSTRACT: For the first time, the feasibility of preparing complex-forming polymers by copolymerization of two monomers was demonstrated. Cationic copolymerization of diphenylketene and vinyl acetate in the presence of  $\text{SnCl}_4$  catalyst followed by saponification was used to obtain a polymer capable of complex formation with transition metals.

Card 1/3

L 62617-65

ACCESSION NR: AP5018427



It is noted that complex-forming polymers are of interest for the isolation of specific metals from mixtures and as polyelectrolytes useful in biological simulation. The reaction was carried out in special equipment described in the original article. The reactivity ratios of the monomers were determined, and a great tendency for alternation of the copolymer repeating units was shown. The copolymer was a yellow solid, softening at 60°C, soluble in toluene, dimethylformamide,  $\text{CCl}_4$ ,  $\text{CHCl}_3$ , acetone, and ethyl ether, and insoluble in saturated hydrocarbons and water. The saponification product was a brittle, brown solid, soluble in water and alcohols.

Card 2/3

L 62617-65

ACCESSION NR: AP5018427

but not in acetone. Sorption of  $Mn^{+2}$  was carried out from acetone solutions of the nitrate; the sorption capacity was high—5.5 mg-eq/g. Orig. art. has: 2 figures; 1 table, and 3 formulas. [SM]

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute)

SUBMITTED: 28 Jul 64

ENCL: 00

SUB CODE: CC, CC

NO REF SOV: 002

OTHER: 013

ATD PRESS: 4058



Card

3/3

KARGIN, V.A.; GORINA, I.I.

Elementary process of structuration in polypropylene. Vysokom.sped.  
7 no.7:1273-1275 71 '65. (MIRA 18:8)

1. Institut neftekhimicheskogo sinteza AN SSSR.



L 64767-65 EPP(c)/EPP(n)-2/EWP(j)/EWA(h)/EWT(m)/T/EWA(1) GG/RM  
 UR/0190/65/007/008/1306/1309  
 678.01:535.34  
 ACCESSION NR: AP5020962  
 AUTHOR: Slovozhotova, N. A.; Sadovskaya, G. K.; Vasil'yev, L. A.; Kargin, V. A.  
 TITLE: Investigation of the effect of fast electrons on the structure of poly(vinyl chloride)  
 SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 8, 1965, 1306-1309  
 TOPIC TAGS: polyvinyl chloride, conjugated polymer, IR analysis, ionizing radiation, polymer structure  
 ABSTRACT: The effect of ionizing radiation on the structure of poly(vinyl chloride) has been studied by IR spectroscopy. Irradiation was carried out in vacuum at 20°C or -196°C with fast electrons from an electron accelerator source with 400-800 Mrad doses. It was found that irradiation caused: 1) dehydrochlorination to form isolated or conjugated vinylene double bonds; 2) break of the backbone to form end-group double bonds and methyl groups, and 3) aromatic system formation. The nature of the structural changes depended on the irradiation temperature. For example, irradiation

Cord 1/2



L 64767-65

ACCESSION NR: AP5020962

with 800 Mrad at 200 caused an increase in the conjugated double bond concentration and the appearance of aromatic systems. Orig. art. has: 1 figure and 2 formulas. [SM]

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpovaya (Physicochemical Institute)

SUBMITTED: 01Aug64

ENCL: 00

SUB CODE: OC, OP

NO REF SOV: 000

OTHER: 011

ATD PRESS: 4080

Card

778  
2/2

KARGIN, V.A.; GORINA, I.I.

Electron microscope study of the deformation of fibrillar  
dendrites of polypropylene. Vysokom. speed. 7 no.8:1323-  
1325 Ag '65. (MIRA 18:9)

1. Institut neftekhimicheskogo sinteza AN SSSR.

KARGIN, V.I.; FELIKHOVA, V.I.; MARKOVA, A.A.

Stretching and contraction processes of polyethylene film  
having spherulite structures. Vysokom. Soed. 1995, 1495.  
1499-1505. (MIRA 18-10)

1. Statekhin-Mechobsky Institute of High Pressure Moscow.

L 1140-66 EMT(m)/EPF(c)/EWP(j) RM

ACCESSION NR: AP5022594

UR/0190/65/007/009/1520/1525  
678.01:53+678.481

AUTHORS: Plate, N. A.; Tran Kh'yeu; Shibayev, V. P.; Kargin, V. A.

TITLE: Structural transformation in gutta-percha due to disturbance of the chemical regularity of the chain

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 9, 1965, 1520-1525

TOPIC TAGS: rubber, resin, polymer, gutta percha, chlorinated polymer, polyisoprene, chlorine, bromine

ABSTRACT: The influence of the degree of irregularity in polymer chains on the crystallization, structure formation, and certain physico-chemical properties of polymers was studied. The substance investigated was trans-1,4-polyisoprene (gutta-percha). Irregularity of the chain was realized by partial chlorination and bromination. Halogenation was accomplished under homogeneous and heterogeneous conditions. X-ray analysis of halogenated gutta-percha specimens was carried out, and the results are given in tabular form. The effect of halogenation on the melting point has been investigated and the results are given graphically in Fig. 1 on the Enclosure. It was found that introduction of 5-6 atoms of

Cord 1/3

L 1140-66

ACCESSION NR: AP5022594

chlorine or 3-4 atoms of bromine per 100 atoms of carbon leads to a lowering of the melting point temperature of gutta-percha in agreement with Flory's theory. An increase in the Cl or Br content, up to 30 or 40% respectively, causes complete amorphization of gutta-percha. The introduction of more than 12% Cl facilitates the  $\alpha$  to  $\beta$  transition in gutta-percha. Orig. art. has: 2 tables, 1 graph, and 2 equations. 2

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 02Oct64

ENCL: 01

MT,  
SUB CODE: 00

NO REF SOV: 006

OTHER: 004

Card 2/3

L 1140-66

ACCESSION NR: AP5022594

ENCLOSURE: 01

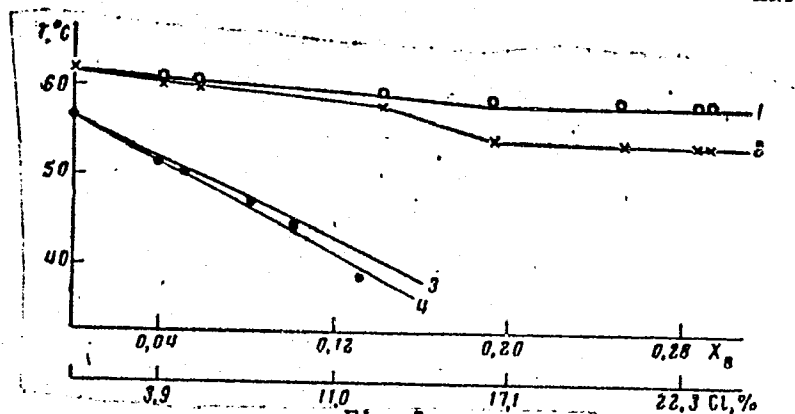


Fig. 1.

Dependence of melting point of gutta-percha ( $T_{mp}$  and  $T'_{mp}$ ) on the number of chlorinated linkages ( $X_B$ ) for hetero and homogeneous chlorination of specimens ( $X_B$  - mole fraction of chlorinated linkages in gutta-percha). 1, 2 -  $T_{mp}$  and  $T'_{mp}$  - of heterogeneously chlorinated specimens, determined before and after the melting of  $\alpha$  - gutta-percha respectively; 3 - theoretical curve calculated after Flory; 4 - experimental curve

Card 3/3

L 1141-66 EWT(m)/EPF(c)/ENP(j) RM  
ACCESSION NR: AP5022595

UR/0190/65/007/009/1526/1528  
678.01:53+678.76

AUTHORS: <sup>44</sup>Tran Kh'yeu; <sup>44</sup>Plate, N. A.; <sup>44</sup>Shibayev, V. P.; <sup>44</sup>Kargin, V. A. <sup>44</sup>

TITLE: Effect of the chemical irregularity of trans-1,4 polyisoprene<sup>15</sup> on its structural and mechanical properties <sup>30</sup>

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 9, 1965, 1526-1528

TOPIC TAGS: polyisoprene, polymer, resin rubber, <sup>44</sup>crystalline polymer

ABSTRACT: This investigation is an extension of the work on gutta-percha reported previously by the authors (Vysokomolek. soyed. 6, 231, 1964). Mechanical properties and electron micrographs of the following chlorinated and brominated specimens of gutta-percha<sup>15</sup> containing 5.8, 14.8, 26, and 52% of Cl and 13.3, 16.5, 20.2, and 27.2% of Br respectively were determined. The mechanical properties were studied by means of a Polyani dynamometer. The experimental results are shown in Figures 1 and 2 on the Enclosure. It was found that the transition from the regular to irregular structure leads to degeneration of spherulite structure and to formation of a ribbon-like structure typical of rubbery polymers. Orig. art. has: 2 graphs and 11 photographs.

Card 1/3



L 1141-66

ACCESSION NR: AP5022595

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im M. V. Lomonosova (Moscow  
State University) 44

SUBMITTED: 020ct64

ENGL: 01

SUB CODE: 00

NO REF SOV: 007

OTHER: 002

Card 2/3

L 1141-66

ACCESSION NR: AP5022595

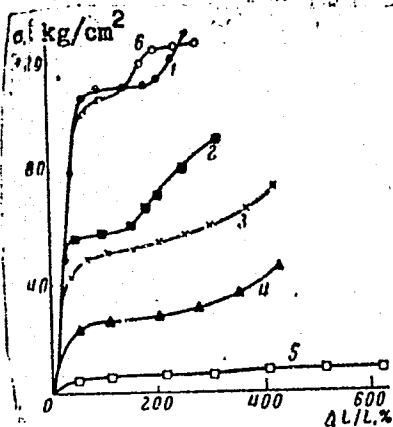


Fig. 1. Elongation curves for gutta-percha and chlorogutta-percha films at 20C. 1- gutta-percha; 2 - 5- chlorogutta-percha containing 5.8, 14.8, 26.0, 52.0% of Cl respectively; 6- gutta-percha film (5.8 Cl) after annealing

Card 3/3

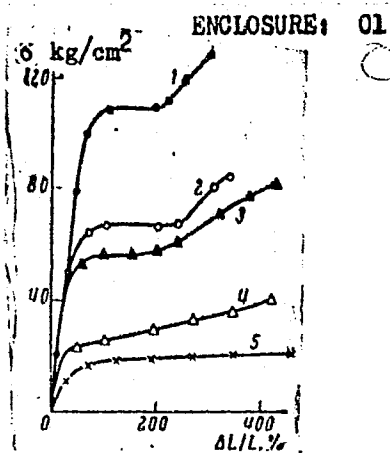


Fig. 2. Elongation curves for gutta-percha at 20C. 1- gutta-percha; 2 - 5- bromogutta-percha containing 13.3, 16.5, 20.2, 27.2% of Br respectively

L 8864-66 SWT(m)/EWP(j) RM  
ACC NR: AP5025952 SOURCE CODE: UR/0190/65/007/010/1665/1666  
AUTHOR: <sup>44,55</sup>Tran Kh'yeu; <sup>44,55</sup>Plate, N.A.; <sup>44,55</sup>Shibayev, V.P.; <sup>44,55</sup>Kargin, V.A. <sup>605</sup>  
ORC: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet) <sup>44,55</sup>  
TITLE: Effect of spherulite size on the nature of the deformation of gutta percha films  
SOURCE: Vysokomolekulyarnyye soyedineniya, v.7, no. 10, 1965, 1665-1666.  
TOPIC TAGS: rubber, solid mechanical property, elastic deformation, tensile stress, elongation, *POLYMER, SYNTHETIC RUBBER*  
ABSTRACT: The dependence of mechanical properties of gutta percha films on the size of the spherulite structures in the polymer was examined using gutta percha of about 30,000 molecular weight. Spherulite formations with diameters from 1.5 mm to 30 microns were obtained by controlling the rate of solvent evaporation.

UDC 678.01:53 + 678.481

Card 1/2

L 8864-66

ACC NR: AP5025952

A change in the size of the spherulites greatly affected the deformation characteristics on stretching. Films containing the large 1.5 mm spherulites are brittle and weak. As the spherulite size is reduced to 20-30 microns the material becomes stronger, exhibiting high tensile strengths and large relative elongations. Orig. art. has: 1 figure.

SUB CODE: MT/ SUBM DATE: 02Oct64/ ORIG REF: 003 / OTH REF: 002

EC

Card 2/2

L 8866-66 EWT(m)/EWP(j)/T RM/VW

ACC NR: AP5025954

SOURCE CODE: UR/0190/65/007/010/1670/1672

AUTHOR: Kardash, G. G.; Andrianova, G. P.; Bakeyev, N. F.; Kargin, V. A.

ORG: Institute of petrochemical Synthesis, AN SSSR (Institut neftekhimicheskogo sinteza AN SSSR)

TITLE: Investigation of the deformation of isotactic polypropylene at low temperatures

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 10, 1965, 1670-1672

TOPIC TAGS: polypropylene plastic, polymer structure, amorphous polymer, crystalline polymer, plastic deformation, elongation

ABSTRACT: The deformation of crystalline and amorphous polypropylene was studied at low temperatures to help elucidate the nature and mechanism of major deformations. It was found that crystallization of isotactic polypropylene sharply increases its ability to deform below its glass temperature. Thus the elongation at break of crystallized samples with well developed structures is 200-150% at -40 to -70°, while amorphous and atactic polypropylene rupture readily at these temperatures. The reversibility of polypropylene deformations

Card 1/2

UDC: 678.01:53+678.742

L 8866-66

ACC NR: AP5025954

realized below the glass temperature indicates that the deformation of crystalline polymers under these conditions is analgous in its nature to the forced elastic deformation of polymers with rigid macromolecules. Orig. art. has: None

SUB CODE: MT, OC/ SUBM DATE: 20Oct64/ ORIG REF: 005/ OTH REF: 002

PC  
Card 2/2

L 8862-66 ENT(m)/EWP(j)/T/EWA(c) RPL WW/RM

ACC NR: AP5025964

SOURCE CODE: UR/ 0190/65/007/010/1779/1786

AUTHOR: Papisov, I. M.; Kabanov, V. A.; Kargin, V. A.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: Conditions for the onset of rapid polymerization below the monomer melting points. Rapid polymerization as thermal explosion

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 10, 1965, 1779-1786

TOPIC TAGS: polymerization, polymerization kinetics, methylmethacrylate, organic nitrile compound

ABSTRACT: The investigation of polymerizing frozen monomers in thin layers is continued in this study with acrylonitrile, methylmethacrylate and acrylonitrile-propionitrile mixtures. The dependence of the occurrence of explosive polymerization in systems produced by simultaneous freezing of monomer and initiator (magnesium) vapor upon the thickness of the condensate layer, initiator concentration and surface temperature change was examined. It was shown that the rate of explosive polymerization below the melting point of the monomers taking

Card 1/2

UDC: 66.095.26



L 8862-66

ACC NR: AP5025964

place in the process of phase transitions is determined by the rate of these transformations. Explosive polymerization under such conditions has the characteristics of spontaneous thermal ignition. Orig. art. has: 11 equation, 3 tables and 2 figures.

SUB CODE: OC, GC, TD/ SUBM DATE: 23Nov64/ ORIG REF: 009/ OTH  
REF: 005

BYX.  
Card 2/2

L 8859-66 EWT(m)/EWP(j)/T/EWA(c) RPL WW/RM

ACC NR: AP5025965

SOURCE CODE: UR/0190/65/007/010/1787/1791

AUTHOR: Kabanov, V. A.; Papisov, I. M.; Gvozdetkiy, A. N.; Kargin, V. A.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: Role of "mobile prearrangements" in rapid polymerization below the monomer melting points

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 10, 1965, 1787-1791

TOPIC TAGS: polyacrylonitrile, crystallization, polymerization, copolymerization, polymerization kinetics, polymerization rate, copolymer

ABSTRACT: polymerization of acrylonitrile<sup>7</sup> in the system inert diluent-acrylonitrile and copolymerization<sup>7</sup> in the acrylonitrile-propionitrile system were investigated at temperatures below the monomer melting point to determine if diffusion migration of the monomer molecule is sufficient for rapid conversion to the polymer. Reactions were run at -196° using n-hexane or cyclohexane as inert diluents. The copolymeri-

Card 1/2

UDC: 66.095.26

L 8859-66

ACC NR: AP5025965

zation product with propionitrile, regardless of initial monomer concentration, contained 57 mol% propionitrile, corresponding to its content in the eutectic phase. The most favorable conditions for rapid polymerization of monomers below their melting points occur at the instant when the mobility of the monomer molecule coincides with the ordering of the monomer molecules in the crystal, for instance, during phase transition in the solid polymer. This condition exists at the boundary of the crystals and the noncrystallized mass during the motion of the crystallization front. It is suggested that "mobile prearrangements" are formed momentarily on the crystal phase boundary; these are rapidly converted to polymer chains. Thus the polymerization front moves immediately behind the phase transition front. Orig. art. has: 3 figures and 2 tables.

SUB CODE: GC, OC, TD/ SUBM DATE: 23Nov64/ ORIG REF: 003/ OTH  
REF: 004

BVK  
Card 2/2

I 9492-66 EWT(m)/EWP(j)/T WN/RM

ACC NR: AP6001865

SOURCE CODE: UR/0190/65/007/012/2108/2111

AUTHOR: Kargin, V. A.; Sogolova, T. I.; Kurbanova, I. I.

ORG: Physicochemical Institute im. L. Ya. Karpov (Fiziko-khimicheskiy institut)

TITLE: Effect of artificial nuclei on the crystallization conditions and mechanical properties of crystalline polypropylene

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 12, 1965, 2108-2111

TOPIC TAGS: polypropylene, crystallization, polymer, solid mechanical property, nucleus

ABSTRACT: A study has been made of the effect of artificial crystallization nuclei on the morphological forms and mechanical properties of crystallizing polymers. Highly crystalline polypropylene specimens were used with or without 16% bismuth salicylate or titanium oxalate added as artificial crystallization nuclei. Morphology was studied with the MIN-8 polarizing microscope; the strength and deformability of the specimens were estimated with a pendulum type dynamometer. The specimens were prepared under different conditions (heating and cooling). The preparative conditions were shown to affect the diameter of the spherulite-type morphological forms produced; this diameter varied between 10 and 500  $\mu$  in individual experiments. Addition of artificial crystallization nuclei produced finer, more uniform morphological forms, accelerated crystallization, and improved the strength and deformability of specimens in a wide temperature range. Stretching of polypropylene specimens pre-

Card 1/2

UDC: 542.65+678.01:53+678.7

L 9492-66

ACC NR: AP6001865

pared with the added artificial nuclei formed necks whose structure was more uniform than that of those formed under similar conditions by the original polypropylene. [B0]  
Orig. art. has: 4 figures.

SUB CODE: 20, 07/ SUBM DATE: 20Jan65/ ORIG REF: 006/ ATD PRESS: 4162

  
Card 2/2